

CLAIMS:

1. A method of operating a mobile telephone (1) in a cellular telephone communications system in which a plurality of service providers provide respective alternative communications channels (80,81,82,83); comprising the steps of;

storing routing information in a look-up table (122; 134,135; 900,1000) of the mobile telephone such that the table is populated with data in the form of preferred route codes, each preferred route code being representative of a preferred route for connection to a respective call destination;

originating an outgoing telephone call by the input of user generated call destination information;

accessing the look-up table using an address determined at least in part by the call destination information to obtain a selected preferred route code;

selecting one (83) of the communication channels in accordance with the preferred route code; and

establishing communication for the outgoing telephone call for a call destination corresponding to the call destination information via the selected communication channel of a corresponding selected service provider (4C).

2. A method as claimed in claim 1 wherein the preferred route codes comprise the results of a route selection decision by a control centre (7) remote from the mobile telephone.

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3. A method as claimed in claim 2 wherein the decision is based at least in part on least-cost.

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4. A method as claimed in any of claims 2 and 3 wherein the decision is based at least in part on performance of at least one network selected in accordance with the preferred route.

5. A method as claimed in any preceding claim wherein the preferred route codes further determine a choice of a further network (5A, 5B, 5C) for forward connection between a network (8A) of the service provider of the selected communication channel and the call destination (2) via the further network.

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6. A method as claimed in claim 5 wherein the control centre collates billing information in respect of services provided by the service provider and one or more further service providers of the further networks in facilitating the making of the call to the call destination.

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7. A method as claimed in any of claims 5 and 6 wherein the mobile telephone adds a prefix code (50) to the user generated call destination information.

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8. A method as claimed in claim 7 wherein the prefix code includes a customer identification field (52) containing user specific identification data.

5 9. A method as claimed in any of claims 7 and 8 wherein the prefix code includes a charging information field (51) for identifying a control entity (7) to be billed by one or more service providers corresponding to the selected network connection route.

10. A method as claimed in any preceding claim including the step of the mobile telephone periodically scanning (62) received transmissions to identify available communications channels (80, 81, 82, 83) and completing (63) a registration procedure for all available channels in order to facilitate subsequent communication by selection therefrom.

11. A method as claimed in claim 10 including the step of electing (64) from the available channels a home channel (81) for receipt of incoming calls.

12. A method as claimed in any of claims 10 and 11 including the step of electing (65) from the available channels an update receiving channel (80) for receipt of updating information broadcasts.

25 13. A method as claimed in any preceding claim wherein the look-up table (1000) is stored in a portable storage medium (505) removably installed in the mobile telephone.

14. A method as claimed in claim 13 wherein the storage medium is a smart card (505).

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15. A method as claimed in any of claims 13 and 14 wherein the portable storage medium is a SIM (subscriber identity module) card (505) which also stores subscriber specific data for identification and authentication purposes.

16. A method as claimed in any of claims 13 to 15 wherein the look-up table is populated with an initial set of data before installation of the storage medium in the mobile telephone.

17. A method as claimed in any preceding claim including the step of periodically updating the data stored in the look-up table by receiving data blocks each containing a respective portion of updated data and, for each received data block, overwriting a corresponding portion of the existing data with updated data from the received block.

18. A method as claimed in any preceding claim wherein the look-up table (900) comprises:

a routing table (1101) containing the preferred route codes;

a carrier selection table (1102) containing, for each preferred route code, a list in order of priority of carrier selections to be used, subject to availability; and

a carrier access table (1103) containing, for each carrier selection, a channel selection identifying a communications channel provided by a service provider of

the mobile telephone system and a prefix code to be added to the dialled number identifying a further network for routing the call.

19. A method as claimed in claim 18 wherein the look-up table further comprises a carrier availability table (1104) containing information indicating which of the channels are currently available.

20. A method as claimed in claim 19 wherein the step of accessing the look-up table comprises:

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        addressing (1203) the routing table to obtain a
preferred route code;

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using the preferred route code to address (1204) the carrier selection table to obtain a list of carrier selections;

addressing (1205) the carrier access table using the first carrier selection on the list to obtain the prefix code and channel selection data for the first channel selection; and

addressing (1206) the carrier availability table using the channel selection data to determine (1207) if the first carrier selection is one of the available channels and, if so, initiating (1208) the call to the call destination using the prefix code via the channel selection data for the first carrier selection.

21. A method as claimed in claim 20 wherein, if the first carrier selection is determined (1207) not to be an

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available channel, the carrier availability table is addressed (1210) using channel selection data for a further carrier selection from the list and, if it is determined (1207) that the further carrier selection is an available channel, the call is initiated (1208) using the prefix code and channel selection data for the further carrier selection.

22. A method as claimed in claim 19 wherein the mobile telephone searches for available communications channels of the cellular telephone communications system and updates (66) the carrier availability table accordingly.

23. A method as claimed in any preceding claim wherein the look-up table comprises default route data and wherein if accessing the look-up table with the call destination information fails to locate corresponding data defining a preferred route code, the preferred route code is derived from the default route data.

24. A method as claimed in any preceding claim wherein updating information for updating the look-up table is communicated to the mobile telephone via a selected one of the available communications channels.

25. A method as claimed in claim 24 wherein the updating information is transmitted using an SMS (short message service) protocol.

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26. A method as claimed in any of claims 24 and 25 wherein the updating information is transmitted as a multipoint broadcast to a plurality of mobile telephones.

27. A method as claimed in any of claims 1 to 26 wherein the updating information is transmitted to the mobile telephone as a web page.

28. A method as claimed in claim 27 wherein the web page is transmitted using Wireless Application Protocol.

29. A method as claimed in any of claims 27 and 28 wherein the mobile telephone processes the web page to extract updating information; stores the extracted updating information in a buffer memory; and updates the look-up table with updating information read from the buffer memory.

30. A method as claimed in any of claims 1 to 23 wherein the updating information is communicated to the mobile telephone by detachably connecting the mobile telephone to a docking station (1300,1500) and transmitting the updating information to the mobile telephone via the docking station.

31. A method as claimed in claim 30 wherein the docking station (1300) is connected to receive a multipoint broadcast of updating information via a broadcast network (1301).

32. A method as claimed in claim 31 wherein the docking station receives updating information as signals multiplexed in a television transmission signal.

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33. A method as claimed in claim 32 wherein the signal is multiplexed in the vertical blanking interval of the television transmission signal.

34. A method as claimed in any of claims 31 to 33 wherein the broadcasting network is an optical cable network (1301).

35. A method as claimed in any of claims 31 to 33 wherein the broadcasting network is a satellite television network.

36. A method as claimed in claim 30 wherein the docking station (1500) is connected to a telephone line (1501) and updating information is received from the control centre in response to making a telephone call request to the control centre via the telephone line.

37. A method as claimed in claim 36 wherein the docking station (1500) comprises a modem (1600) connected to the telephone line and which generates the telephone call request in response to user actuation of the docking station.

38. A method as claimed in claim 36 wherein the mobile



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telephone comprises a modem (1600) connected to the telephone line via the docking station and which generates the telephone call request in response to user actuation of the mobile telephone.

39. A method as claimed in any of claims 30 to 38 wherein the mobile telephone comprises an internal battery (1400) which is recharged by detachably connecting the mobile telephone to the docking station.

40. A method as claimed in any preceding claim wherein the preferred route code determines a route via a packet switched network (1800) and comprises network address information defining at least one node (1801) of the network which is to be included in the selected route.

41. A method as claimed in claim 40 wherein the network address information defines at least one further node (1802) of the network which is not to be included in the selected route.

42. A method as claimed in any of claims 40 and 41 wherein the outgoing telephone call is transmitted as a packetised signal using a protocol in which such signals include a start address indicator interpreted by the network as being representative of a network address from which the call originates and comprising the further step of transmitting the outgoing telephone call including start address information (1902) defined by the preferred

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route code.

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43. A method as claimed in claim 42 wherein the start address information is representative of a start address which is different from the actual start address of the outgoing telephone call in the network.

44. A method as claimed in any preceding claim wherein the telephone call is originated to communicate data comprising a type of data selected from a set of alternative types of data.

45. A method as claimed in claim 44 wherein the set of alternative types of data comprises voice data, image data and data formatted in accordance with an Internet protocol.

20 46. A method as claimed in any of claims 43 and 44 wherein the look-up table stores respective preferred route codes for each of the types of data.

25 47. A method as claimed in any preceding claim wherein the cellular telephone system comprises part of a packet switching network in which the mobile telephone constitutes a node of the network and wherein the call destination constitutes a further node of the network.

48. A mobile telephone (1) for use in a cellular telephone communications system in which a plurality of

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service providers provide respective alternative communications channels (80,81,82,83);

the mobile telephone comprising;

5 a look-up table (122; 134,135; 900,1000) storing routing information such that the table is populated with data in the form of preferred route codes, each preferred route code being representative of a preferred route for connection to a respective call destination;

10 input means (130) for originating an outgoing telephone call by the input of user generated call destination information;

15 accessing means (133) for accessing the look-up table using an address determined at least in part by the call destination information to obtain a selected preferred route code;

channel selecting means (300) for selecting one (83) of the communication channels in accordance with the preferred route code; and

20 communication means (302,137) for establishing communication for the outgoing telephone call for a call destination corresponding to the call destination information via the selected communication channel of a corresponding selected service provider (4C).

25 49. A mobile telephone as claimed in claim 48 comprising code generating means (131) operable to add a prefix code (50) to the user generated call destination information.

50. A mobile telephone as claimed in claim 49 wherein

the prefix code includes a customer identification field (52) containing user specific identification data.

51. A mobile telephone as claimed in any of claims 49 and 50 wherein the prefix code includes a charging information field (51) for identifying a control entity (7) to be billed by one or more service providers corresponding to the selected network connection route.

52. A mobile telephone as claimed in any of claims 48 to 51 comprising means (300) for periodically scanning received transmissions to identify available communications channels (80,81,82,83) and completing a registration procedure for all available channels in order to facilitate subsequent communication by selection therefrom.

53. A mobile telephone as claimed in claim 52 including electing means for electing from the available channels a home channel (81) for receipt of incoming calls.

54. A mobile telephone as claimed in claim 53 wherein the electing means is further operable to elect from the available channels an update receiving channel (80) for receipt of updating information broadcasts.

55. A mobile telephone as claimed in any of claims 48 to 54 wherein the look-up table (1000) is stored in a portable storage medium (505) removably installed in the

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mobile telephone.

56. A mobile telephone as claimed in claim 55 wherein the storage medium is a smart card (505).

57. A mobile telephone as claimed in any of claims 55 and 56 wherein the portable storage medium is a SIM (subscriber identity module) card (505) which also stores subscriber specific data for identification and authentication purposes.

58. A mobile telephone as claimed in any of claims 48 to 57 comprising updating means (901,136) for periodically updating the data stored in the look-up table by receiving data blocks each containing a respective portion of updated data and, for each received data block, overwriting a corresponding portion of the existing data with updated data from the received block.

59. A mobile telephone as claimed in any of claims 48 to 58 wherein the look-up table (900) comprises:

a routing table (1101) containing the preferred route codes;

a carrier selection table (1102) containing, for each preferred route code, a list in order of priority of carrier selections to be used, subject to availability; and

a carrier access table (1103) containing, for each carrier selection, a channel selection identifying a

communications channel provided by a service provider of the mobile telephone system and a prefix code to be added to the dialled number identifying a further network for routing the call.

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60. A mobile telephone as claimed in claim 59 wherein the look-up table further comprises a carrier availability table (1104) containing information indicating which of the channels are currently available.

61. A mobile telephone as claimed in claim 60 wherein the accessing means comprises:

means (500) for addressing the routing table to obtain a preferred route code;

means (500) for using the preferred route code to address the carrier selection table to obtain a list of carrier selections;

means (500) for addressing the carrier access table using the first carrier selection on the list to obtain the prefix code and channel selection data for the first channel selection; and

means (500) for addressing the carrier availability table using the channel selection data to determine (1207) if the first carrier selection is one of the available channels and, if so, initiating (1208) the call to the call destination using the prefix code via the channel selection data for the first carrier selection.

62. A mobile telephone as claimed in claim 61 wherein,

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66. A mobile telephone as claimed in claim 65 wherein the updating information is extracted from signals encoded using an SMS (short message service) protocol.

67. A mobile telephone as claimed in claim 66 wherein the extracting means (500) is operable to extract the updating information from data transmitted to the mobile telephone as a web page.

68. A mobile telephone as claimed in claim 67 wherein the extracting means extracts updating information from the web page using Wireless Application Protocol.

~~69. A mobile telephone as claimed in any of claims 67 and 68 wherein the extracting means comprises a processor operable to process the web page to extract updating information; store the extracted updating information in a buffer memory (902); and update the look-up table with updating information read from the buffer memory.~~

70. A mobile telephone as claimed in any of claims 48 to 64 comprising connecting means (1302) operable to detachably connect the mobile telephone to a docking station (1300,1500) and an interface (1406) for receiving the updating information transmitted in use to the mobile telephone via the docking station.

~~71. A mobile telephone as claimed in claim 70 co-operable in use with a docking station (1500) connected~~



5 to a telephone line (1501) such that updating information is received from the control centre in response to making a telephone call request to the control centre via the telephone line; wherein the mobile telephone comprises a modem (1600) connectable in use to the telephone line via the docking station and which modem is operable to generate the telephone call request in response to user actuation of the mobile telephone.

10 15 72. A mobile telephone as claimed in any of claims 48 to 71 wherein the preferred route code determines a route via a packet switched network (1800) and comprises network address information defining in use at least one node (1801) of the network which is to be included in the selected route.

20 73. A mobile telephone as claimed in claim 72 wherein the network address information defines in use at least one further node (1802) of the network which is not to be included in the selected route.

25 74. A mobile telephone as claimed in any of claims 72 and 73 comprising means for transmitting the outgoing telephone call as a packetised signal using a protocol in which such signals include a start address indicator interpreted in use by the network as being representative of a network address from which the call originates and wherein the transmitting means is operable to transmit the outgoing telephone call including start address

information (1902) defined by the preferred route code.

75. A mobile telephone as claimed in any of claims 48 to 74 and operable to output communications signals representative of a type of data selected from a set of alternative types of data.

76. A mobile telephone as claimed in claim 75 wherein the types of data comprise voice data, image data and data formatted in accordance with an Internet protocol.

77. A mobile telephone as claimed in any of claims 75 and 76 wherein the look-table stores respective preferred route codes for each of the types of data.

78. A docking station for use with a mobile telephone having a look-up table for routing information, the docking station comprising connecting means for detachably connecting the mobile telephone to the docking station and an interface (1405) for transmitting updating information in use to the mobile telephone for updating the look-up table.

79. A docking station as claimed in claim 78 operable to receive a broadcast of updating information via a broadcast network and comprising a decoder (1401) for decoding signals multiplexed in the vertical blanking interval of a television transmission signal.

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80. A docking station as claimed in claim 78 having means for receiving updating information via a telephone line (1501).

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81. A docking station as claimed in claim 80 comprising a modem (1600).

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82. A docking station as claimed in claim 81 comprising means (1700) for initiating the generation of a telephone call via the telephone line requesting the transmission of updating information.

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83. A portable storage medium for use in a mobile telephone, the storage medium storing a look-up table (1000) populated with data in the form of preferred route codes, each preferred route code being representative of a preferred route for connection to a respective call destination.

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84. A portable storage medium as claimed in claim 83 comprising a smart card (505).

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SUB  
A2  
85. A computer program comprising processor implementable instructions for carrying out a method of operating a mobile telephone as claimed in any of claims 1 to 47.

86. A storage medium storing processor implementable instructions for carrying out a method of operating a

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88. A communications signal comprising route selecting information contained in an outgoing telephone call signal in accordance with a method as claimed in any of claims 1 to 47.

89. A method of routing a telephone call comprising adding a prefix code to a user generated call information such that the prefix code defines a preferred route via a packet switching network, wherein the prefix code comprises a string of network node addresses.